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Abstract

The ASEAN+3 region has been well-equipped with various policy tools to help member economies weather the impact of the COVID-19 pandemic. Significant policy cushions and financial reserves built up over the years have allowed member economies to implement support measures of unprecedented size and scale. As the pandemic becomes more manageable, smooth and orderly withdrawals from support policies will become a priority—any premature, disorderly, or miscommunicated exit risks delaying or derailing post-pandemic recovery or worse, triggering systemic financial distress. This paper proposes a "vulnerability to exit risks" framework, based on seven key metrics that broadly capture conjunctural and structural considerations, and assesses when ASEAN+3 economies could potentially start to unwind pandemic support. The framework also helps to identify areas where improvements could strengthen economic resilience going forward.

JEL classification: C43, E61, I18, O40, P52

Keywords: buffer, COVID-19, diversity, exit risks, healthcare, pandemic, policy space, vulnerability

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Abbreviations

ADB	Asian Development Bank
AFC	Asian financial crisis
BN	Brunei Darussalam
CN	China
CPS	cumulated production structure
ERPD	Economic Review and Policy Dialogue
FX	foreign exchange
GFC	global financial crisis
HHI	Herfindahl-Hirschman Index
HK	Hong Kong, China (“Hong Kong”)
ID	Indonesia
IMF	International Monetary Fund
IO	input-output
JHU	Johns Hopkins University
JP	Japan
KH	Cambodia
KR	Korea
LA	Lao PDR
MRIOTs	ADB Multiregional Input-Output Tables
MY	Malaysia
OECD	Organisation for Economic Co-operation and Development
PH	the Philippines
SG	Singapore
STAN	Structural Analysis database
TH	Thailand
VA	value-added
VN	Vietnam
WHO	World Health Organization

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"With more news on vaccines, the horizon looks brighter. But the outlook continues to vary significantly by country…from reliance on contact-intensive activities to the scale of the policy response to sustain the recovery until we have the durable exit from the crisis."

~ Kristalina Georgieva, IMF Managing Director
Joint IMF-State Bank of Vietnam High-Level Conference
November 10, 2020

I. Introduction

The ASEAN+3 region has been well-equipped with various policy tools to help member economies weather the impact of the COVID-19 pandemic. The region faced the health crisis with significant policy cushions and financial reserves built up over the years, attributable to prudent policymaking and lessons learned from past economic crises. Since the 1997–98 Asian financial crisis (AFC), regional economies have built up fiscal space to shore up confidence and domestic demand, along with strengthening their regulatory and governance frameworks. Banks in the region have also been armed with strong capital and liquidity buffers, putting them in a solid position to absorb the pandemic's impact on business and household balance sheets.

As the pandemic subsides and becomes more contained, smooth and orderly exits from support policies that have been unprecedented in size and scale will become a priority. Governments in the region have rolled out substantial fiscal relief measures for households and businesses, including cash transfers, debt relief, tax deferrals, and standby financing lines (Table 1). Central banks have also lowered interest rates, while according regulatory forbearance to financial institutions to allow them to roll over debt payments of borrowers without jeopardizing their balance sheets. As a result, policy space has narrowed significantly in some ASEAN+3 economies (AMRO 2021). Faster progress in vaccinations in the region, along with continued vigilance in containing local outbreaks, will be crucial in allowing authorities some leeway in preserving the remaining policy space.

The global debate on withdrawing stimulus measures has begun, with some policymakers flagging the critical importance of well-designed exits. Lessons from the global financial crisis (GFC) suggest that policymakers need to be careful not to exit too early or persistently discuss exiting publicly at the risk spooking markets (Powell 2021). Avoiding market turbulence is crucial, underscoring the need to be especially careful in communicating any withdrawal of central bank support to markets, which tend to be very sensitive to such information (Politi and Smith 2021).

Exit strategies should take into account the health, macro- and socioeconomic considerations confronting each economy. They include infection trends, pace of vaccination, healthcare capacity, speed and trajectory of economic recovery, extent of any permanent scarring, and policy space, among others. The central banks in some advanced economies, short of touching their policy interest rates, have tapered their bond-buying programs, or have signaled that they would do so in the near-term. Some economies continue to lean toward ultra-accommodative policies, despite rising concerns about inflation (Kho and others 2021). With new variants pushing infections rates to new highs in the ASEAN+3 region, some member economies have emphasized the need for caution in exiting: for example, Singapore is aiming for a "well-placed" exit (Monetary Authority of Singapore 2020), while Korea has highlighted the lingering uncertainties brought on by the pandemic, despite budding signs of recovery.

Table 1. Summary of Pandemic Policies, as of March 2021

		Plus-3				ASEAN									
Fiscal Measures		**CN**	**HK**	**JP**	**KR**	**BN**	**ID**	**KH**	**LA**	**MM**	**MY**	**PH**	**SG**	**TH**	**VN**
Economy-wide	Extension of announced stimulus packages, and other special fiscal measures		●	●			●	●			●	●	●	●	
Individuals/ Households	Direct cash transfers		●	●	●		●	●		●	●	●	●	●	●
	Suspension of rental fees, loan, and interest payments	●	●	●	●	●	●		●	●	●	●	●	●	●
	Debt restructuring						●		●		●	●		●	●
	Government subsidies/ guarantees on minimum wages and extra allowances for employees		●	●	●	●	●	●	●		●	●	●		●
	Tax deferrals, waivers, and rebates on selected purchases	●	●	●	●	●	●		●	●	●	●	●	●	
	Waived fees for digital services (e.g., for banking needs, selected telecommunication charges)			●	●	●					●	●		●	●
	Cash subsidies for vulnerable groups		●	●			●	●			●			●	
	Price freeze on basic necessities								●		●	●		●	
	Subsidized salaries for new graduates joining the workforce		●											●	
	Fee cuts or payment deferrals for services (e.g., transportation; utilities)	●	●	●		●	●		●		●	●		●	●
Businesses	Income tax reductions for key sectors/ Delays in taxation and compulsory payments	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Waived utility fees		●	●			●			●	●				
	Moratoria on debt payments	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Lifting of import restrictions on local enterprises	●	●			●	●		●	●		●			
	Government guarantees on debt/ loans	●	●	●	●		●	●			●	●			
	Reduction or deferral of customs payments for some importers	●				●	●		●	●				●	
	Higher tax benefits for listed companies											●		●	
	Subsidies for maintaining operations and/or employment		●	●	●			●			●		●	●	
	Waived transaction fees for selected securities											●			●
Monetary Measures															
Economy-wide	Extension of announced monetary measures, including but not limited to those listed below			●			●	●			●		●	●	
Businesses	Credit subsidies and credit extension to SMEs	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Temporary financing lines to manage cash flow	●	●	●	●	●	●			●	●	●	●	●	●
	Provision of low-cost loans and soft loans		●	●	●		●	●	●	●	●		●	●	●
	Allowing more corporate bond issuances to support cash flow, including supply chain financing	●			●										
	Purchases of bonds issued by hard-hit companies			●	●									●	
Financial Institutions	Intervention to ease liquidity and expand banks' lending capacity, including aggressive lowering of reserve requirement ratios	●			●		●	●	●	●	●	●	●	●	
	Introduction of special deposit facilities for lenders that undergo mergers or business integration														
	Temporary measures to provide USD and local currency liquidity		●	●	●		●					●	●		
	Full access to low-cost funding for microfinancial institutions									●					
Asset Markets	Central bank's direct purchase of government bonds in the primary market						●				●	●			
	Active purchases of government bonds and papers to stabilize asset markets			●	●		●					●		●	
	Suspension of short-selling in the stock exchange				●		●				●			●	
Regulatory Forbearance															
Economy-wide	Extension of announced monetary measures, including but not limited to those listed below						●	●					●		
Capital Adequacy/ Liquidity	Lower required capital or countercyclical capital buffers		●				●	●			●				
	Lower select liquidity coverage ratios (e.g., foreign exchange) and loan-deposit ratios being imposed		●		●		●					●			
	Lower collateral ratios for select settlement activities/ expanding eligibla collateral			●	●					●					
	Higher range of securities eligible for open market operation transactions			●	●		●								
	Relaxed penalties imposed on institutions with reserve deficiencies											●			
Lending and Borrowing	Flexible treatment of nonperforming loans, thus allowing no additional provisioning on bank balance sheets			●			●	●	●		●	●	●	●	●
	Extension of timeline for banks to restructure loans						●	●		●				●	
	Removal of loan downpayment requirements for selected bank acquisitions														
	Eased loan restructuring and/or Know-Your-Customer rules						●		●	●		●		●	●
	Permission to draw down on capital and liquidity buffers to support lending activities		●	●			●				●	●	●		
Other Activities	Delayed new, tighter rules on asset management activities	●													
	Allowing banks to offload bad loans to asset management companies											●			
	Deferral of new accounting rules for property companies														
	Relaxed rules on buyback of shares						●								
	Higher trading limits and on FX forward positions				●									●	
	More flexible timelines for bank's reporting and other administrative requirements			●	●						●	●	●		

Source: AMRO staff compilation.

We have developed a "vulnerability to exit risks" framework that gauges an economy's potential exposure to growth and financial stability risks associated with the withdrawal of pandemic policies. A premature, disorderly, or miscommunicated exit from pandemic support runs the risk of delaying or derailing the fragile recovery seen across the region, as well as potentially triggering systemic financial distress resulting from cliff effects. Our assessment of vulnerability draws on methodologies developed by AMRO staff, such as the policy space metrics (Poonpatpibul and others 2020), the COVID Turnaround Tracker (AMRO 2020); and the Economic Review and Policy Dialogue (ERPD) Matrix Scorecard (Ong and Gabriella 2020), among others. The rest of this paper is organized as follows: Section II discusses the assessment framework, including the rationale for each indicator and the description of the data used. The scoring methodology for each indicator is described in Section III. Section IV concludes.

II. Framework and Data

A. Assessment Framework

A multiple-metric framework is used to broadly capture the vulnerability of each economy to exit risks. Various economic, social, financial, and regulatory characteristics contribute toward an economy's vulnerability to any withdrawal of policy support. Distilling from a broad set of possible indicators, the framework proposed in this paper applies seven key metrics—comprising both conjunctural and structural considerations—namely: (1) healthcare capacity; (2) size of domestic market; (3) economic diversity; (4) remaining policy space; (5) degree of policy support; (6) recovery rate; and (7) external buffers. Chosen for parsimony and availability of cross-country data, these metrics are scored numerically from "1" to "4," with "4" representing the strongest (lowest vulnerability) position, and "1" the weakest (highest vulnerability) (Table 2).

Table 2. AMRO's Vulnerability to Exit Risks Framework

Metric	Immediacy	Rationale	Range of Outcomes and Corresponding Scores
Healthcare capacity	Conjunctural and structural	The stronger the healthcare capacity, the better the ability to deal with any resurgence in infections from exit.	Weak (1) – Strong (4)
Size of domestic market	Structural	The larger the domestic market (and demand), the faster the recovery in the event that external demand remains weak as a result of containment measures elsewhere.	Small (1) – Large (4)
Economic diversity	Structural	The more diverse the economic structure, the larger the number of possible sources of growth for the economy.	Narrow (1) – Diverse (4)
Remaining policy space	Conjunctural and structural	The more ample the remaining policy space, the greater the ability to support the economy.	Limited (1) – Ample (4)
Degree of policy support	Conjunctural	The lesser the degree of policy support, the lower the risk of a disorderly withdrawal.	Significant (1) – Limited (4)
Recovery rate	Conjunctural	The higher the recovery rate, the greater the buffer for the economy.	Weak (1) – Strong (4)
External buffers	Conjunctural	The higher the reserve coverage, the larger the buffer against capital outflows from the manifestation of exit risks.	Low (1) – High (4)

Source: Authors.

Both quantitative and qualitative approaches are employed to achieve a more comprehensive assessment of the situation in each economy. Where necessary, AMRO staff's expert judgement is relied upon to calibrate the scores for unique country characteristics that may not be adequately captured by the availability or timeliness of reported data. For instance, although the quantity of hospital beds is used as an indicator to measure healthcare capacity, this statistic does not necessarily provide information regarding the quality of the healthcare system. Similarly, the degree of policy support should not only consider the size of fiscal packages but also the quality and effectiveness of measures that aim to shore up market confidence (for example, the availability of standby credit). More importantly, the qualitative adjustments are made vis-à-vis regional peers, to ensure consistency and comparability across scores.

After an economy is assigned scores for each of the seven metrics, they are aggregated to arrive at an overall vulnerability rating. For parsimony and in the absence of a more obvious and credible weighting methodology, equal weights are assigned to individual scores. The overall rating provides an overview of an economy's relative vulnerability; the individual components indicate where the economy may be most vulnerable, pointing to areas of focus when designing an exit strategy, and for the more structural areas, highlight where policy adjustments may be needed to strengthen economic resilience in the medium- to longer-term. *An earlier "scorecard" from AMRO (2021), which took stock of the regional situation in March 2021 (Figure 1), is used to discuss how the scores are estimated in the rest of this paper. The aim is not to opine on the current situation in each ASEAN+3 economy but, rather, to explain how each metric in the framework is assessed.*

Using the proposed framework, AMRO staff are able to identify the relative vulnerability of each ASEAN+3 economy to risks arising from exiting the support policies that have been put in place. For example, half of the region's economies had been ranked strongly in terms of healthcare capacity in October 2020, reflecting relatively low, well-managed infection rates. However, those scores had deteriorated by early-2021, as new COVID-19 clusters and virus variants saw a surge in confirmed cases and fatalities in the region. Conversely, recovery in trade and higher-than-expected remittances in the first half of 2021 had propped up the external buffer scores of some economies, compared to the previous year. The performance across indicators has continued to evolve since then, largely underpinned by changing conjunctural developments.

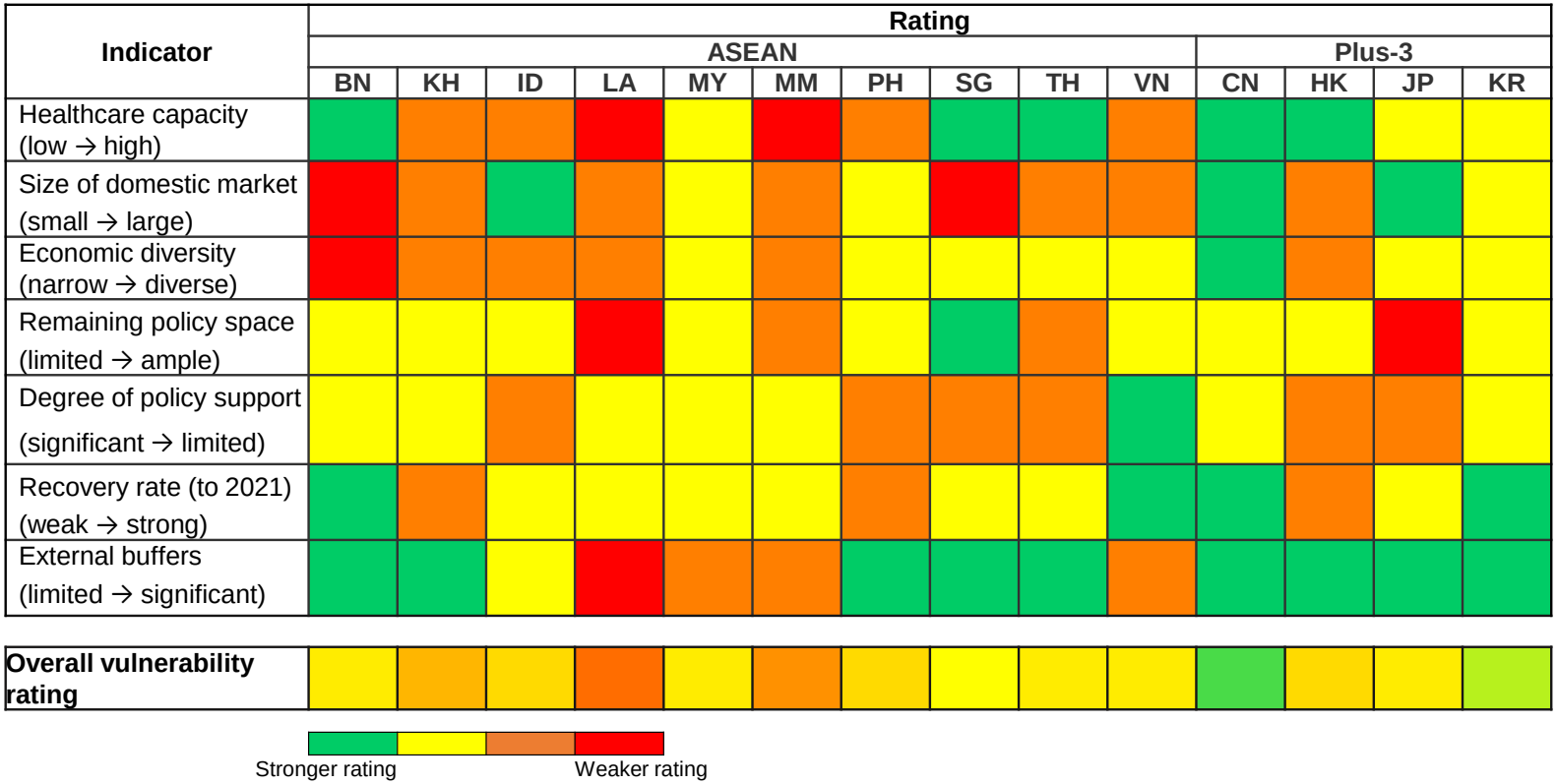
B. Data Sources

The framework draws on third-party information sources as well as AMRO proprietary information. Some of the indicators used to estimate certain metrics are generally more stable and the underlying data are published on an annual basis and/or reported with a lag, while a few are reported at higher frequency (Table 3):

- The healthcare capacity indicator uses daily COVID-19 data compiled by Johns Hopkins University, and information on hospital bed availability is obtained from the World Health Organization (WHO), which updates the data annually;

- The indicator representing the size of the domestic market is derived from annual import-adjusted GDP levels, sourced from the OECD Structural Analysis (STAN) database that is updated on a "rolling basis";

Figure 1. ASEAN+3: Example of Vulnerability to Exit Risks, March 2021
(Rating)



Source: AMRO (2021).
Note: Ratings are assigned as follows: (1) red – weaker; (2) orange – less weak; (3) yellow – less strong; (4) green – stronger. The overall vulnerability rating is a simple average of the individual ratings. Indicators are defined as follows:
"Healthcare capacity" refers to the availability of hospital beds and the quality of healthcare, the latter of which draws on AMRO staff judgement;
"Size of domestic market" refers to the economy's import-adjusted GDP.
"Economic diversity" refers to the relative size of key economic sectors (e.g., agriculture, manufacturing, services), overlaid by AMRO staff judgement about the diversity of industries within each sector.
"Remaining policy space" is based on the methodology presented in Poonpatpibul and others (2020) and shown in Table 1.5.
"Degree of policy support" is based on the size of fiscal packages and volume of existing policy support measures that are still in place at the time of assessment.
"Recovery rate" is proxied by AMRO staff's projections of the output gap as of end-2021.
"External buffers" are the reserve coverage indicator based on the ERPD Matrix Scorecard percentile.
BN = Brunei Darussalam; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = Philippines; SG = Singapore; TH = Thailand; and VN = Vietnam.

- The indicator on economic diversity uses the annual value-added data sourced from the Asian Development Bank (ADB) Multi-Regional Input-Output Tables (MRIOTs), which is updated annually;

- Policy space assessments are formally assessed by AMRO staff, on a semi-annual basis;

- The degree of policy support is estimated based on AMRO's "Panoply of Pandemic Policies" database, which is compiled on a monthly basis from official announcements by national authorities;

- The economic recovery rate indicator is formally estimated by AMRO staff on a semi-annual basis, drawing on a myriad of information on a particular economy;

- The indicator on external buffers is estimated by AMRO staff, using the ERPD Matrix Scorecard methodology described in Ong and Gabriella (2020), and is updated on a monthly basis.

Table 3. AMRO's Vulnerability to Exit Risk Framework: Overview of Data

Metric	Indicator	Sources of Data
Healthcare capacity	COVID-19 infections and deaths; hospital bed density	Johns Hopkins University; WHO
Size of domestic market	Import-adjusted GDP	OECD Structural Analysis (STAN) Database
Economic diversity	Gross value-added by sector	ADB MRIOTs
Remaining policy space	Fiscal estimates; interest rates; macroprudential policies	Poonpatpibul and others (2020); and AMRO staff estimates
Degree of policy support	Pandemic-related policy measures; pandemic spending	National authorities; AMRO's "Panoply of Pandemic Policies" database
Recovery rate	Official GDP figures; AMRO staff projections	National authorities; and AMRO staff estimates
External buffers	Reserve coverage	ERPD Matrix Scorecard

Source: Authors' compilations.

III. Methodology and Indicator Scores

A. Healthcare Capacity

Policies introduced during the COVID-19 pandemic have, appropriately, been dominated by public health considerations. As the COVID-19 pandemic experience has shown to date, renewed outbreaks can happen at any time, even in the most guarded places, particularly as new and more contagious variants evolve and spread around the globe. Physical containment measures implemented to bring outbreaks under control have proven to be effective in reducing transmission, but have come at considerable economic costs. Consequently, concerted policy support has been crucial in sustaining economic activity, and any withdrawal of those economic measures would be closely linked to the easing of social distancing requirements.

The WHO has outlined several important indicators as to when social distancing measures could be eased. The two main dimensions are: (1) the level of transmission; and (2) the healthcare system's response capacity (WHO 2020a; Hale and others 2020; WHO 2020b). Thus, it is important to take into account the severity of virus outbreaks and healthcare capacity when assessing an economy's vulnerability to any unwinding of economic policy support:

- Smaller numbers of infections and a lower risk of renewed outbreaks that could overwhelm the healthcare system would imply a lower burden on emergency support, improved ability to reopen the economy, and hence a more stable environment in which to unwind policy support.

- Conversely, the healthcare system's response capacity could imply drastically different situations amid similar virus outbreaks. Response capacity may be measured by both the actual ability to deliver healthcare services, as well as by the quality of those services. For the same level of transmission, different degrees of social distancing measures and policy support might be needed in different places, depending on an economy's response capacity (WHO 2020b).

The healthcare capacity indicator incorporates two types of measures—a quantitative and a qualitative. Specifically,

- The availability of hospital beds relative to the number of active cases estimates the severity of current outbreaks scaled by an economy's capacity to deliver medical services:

    - The number of active cases is closely linked to the size of an outbreak, thus capturing the transmission dimension. The data, scaled by population, are published daily by Johns Hopkins University.[3]

    - The number of hospital beds serves as a proxy for the healthcare system's ability to cope with outbreaks, or its response capacity. The latest available year of data published by the WHO for each economy are used. Given that the data generally refer to pre-pandemic years, they do not capture any temporary, pandemic-related increases in the number of hospital beds.[4]

    - Scores between "1" (lowest) and "4" (highest) are assigned across economies, depending on the quartile of the current 7-day average of active cases-to-hospital beds ratios, which provides a sense of the evolving capacity of each economy's healthcare system (Figure 2).

- The quality of healthcare represents the qualitative dimension. Scores are adjusted upwards or downwards in line with AMRO staff's judgement on the overall quality of healthcare in a given economy, drawing on various sources of information (for example, the sophistication of testing laboratories or medical facilities).

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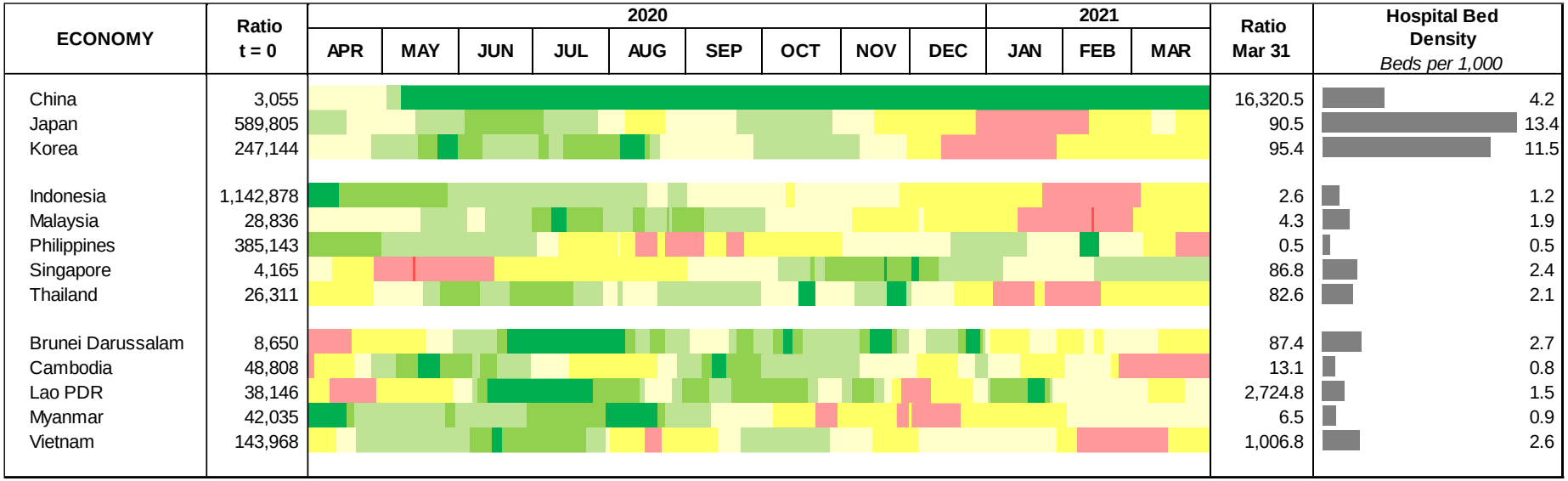
[3] Oeking (2021) discusses the shortcomings and adjustments in measuring active cases. Other measures, such as the hospitalization rate, test positivity rate, or intensive care unit occupancy are not considered, given the unavailability of data across economies.

[4] Another useful indicator would be the doctor-to-patient ratio, but such data are not readily available.

Figure 2. ASEAN+3: Hospital Bed to Active Case Ratios, as of March 31, 2021

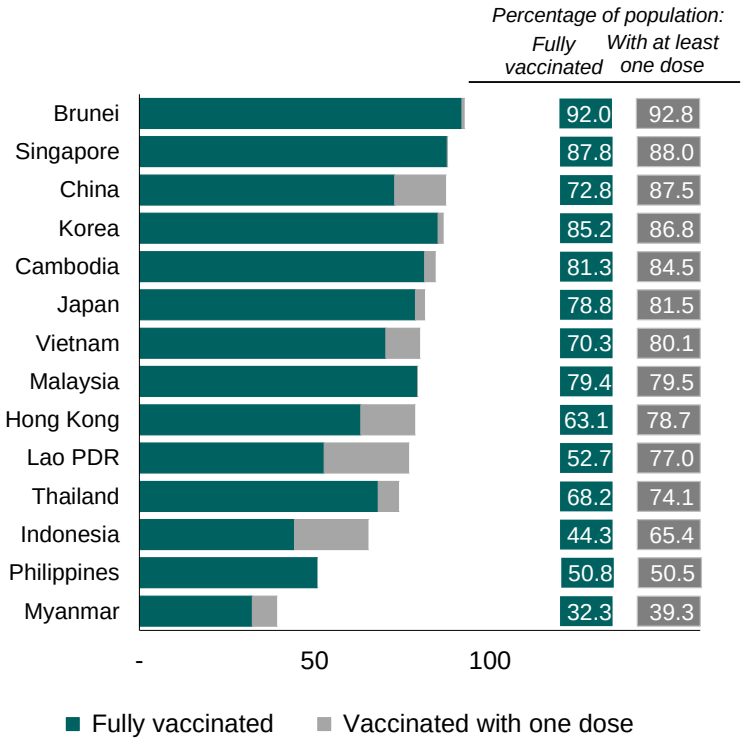


Sources: Haver Analytics, sourced from Johns Hopkins University; WHO; and AMRO staff calculations.
Note: Hospital bed density for Singapore excludes beds in community hospitals and long-term care facilities. t = 0 refers to the value on February 1, 2020. The comparison is relative to each economy's own historical ratios, and does not take into account the quality of healthcare. The greener the heatmap, the greater the ratio (e.g. higher number of beds per one active case); the redder, the lower the ratio (e.g. given the same number of hospital beds, the higher the number of active cases).

Overall, the healthcare capacity indicator should be highest in economies with relatively smaller outbreaks and a higher number of hospital beds. Thus, ASEAN+3 economies that had handled their outbreaks successfully (based on information ending March 31, 2021) were assigned higher scores, while those with relatively larger outbreaks and/or lower assessed healthcare quality were given weaker ratings (Figure 1).

Going forward, the rate of vaccination will also be an important factor in assessing public health risks. The greater the vaccination progress, the lower the likelihood of future outbreaks and fatalities (Centers for Disease Control and Prevention 2021), placing a lower burden on public health facilities and providing the foundation for exiting safely from pandemic policy support. As long as no vaccine-resistant variant emerges, vaccination progress should eventually show up in lower transmission numbers, which are already included in the framework's measure of healthcare capacity. Within the ASEAN+3 region, all economies have already rolled out their vaccination campaigns, albeit with varying degrees of progress (Figure 3).

Figure 3. ASEAN+3: Vaccination Progress, as of January 19, 2022
(Percent of population)



Sources: National authorities and Our World in Data, both via Haver Analytics; various media sources; national health agencies; and AMRO staff estimates and calculations.
Note: The percentage of fully vaccinated population shows the number of people who have received all doses prescribed by the vaccination protocol (for example. one dose of a single-dose vaccine, or two doses of a two-dose vaccine). The number in the gray box is the percentage of the population that has received at least one vaccine dose.

B. Size of Domestic Market

The size of an economy's domestic market provides an indication of potential sources of growth, especially at a time when borders are closed and external demand may still be weak. A bigger domestic market should be able to provide more buffer to the economy even as policy support unwinds; conversely, an economy with a smaller domestic market that relies largely on exports of goods and services may need extended policy stimuli if the external sector remains uncertain or if travel bans are in place. To measure the size of

domestic demand, the framework uses the Input-Output (IO) tables from the 2018 edition of the OECD Structural Analysis (STAN) database and employs the import-adjusted GDP method presented by Kranendonk and Verbruggen (2008), which attributes total imports to all expenditure components of GDP in the following form:

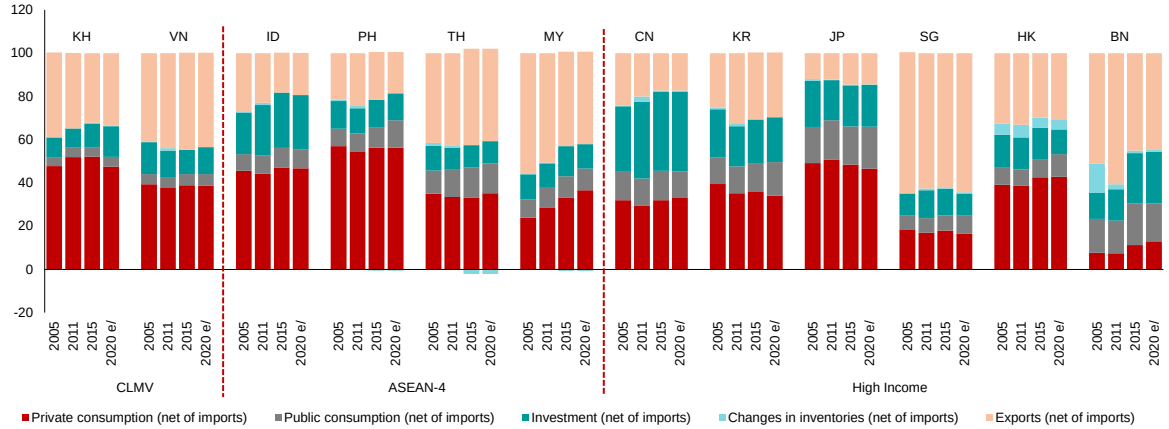
$$Y = (C - MC) + (I - MI) + (G - MG) + (E - ME),$$

where,
MC = final and intermediate goods imports for private consumption;
MI = final and intermediate goods imports for investment;
MG = final and intermediate goods imports for public consumption; and
ME = final and intermediate goods imports for exports.

In the ASEAN+3 region, net exports ranged from 14–65 percent of import-adjusted GDP as of the end of 2020. Those with higher percentage shares are assigned the lowest score of "1" in this framework, and thus include exporters of goods that are sensitive to global demand, such as electronics and commodity products, as well as those that rely heavily on exports of close-contact services. In other words, an economy's relative reliance on travel and tourism, demand for which has been decimated by the pandemic, also feeds into this metric. As long as the outlook for exports of travel and tourism services remains highly uncertain, policy support would be required for a much longer period for related hard-hit industries.

ASEAN+3 economies vary significantly in terms of the size of their domestic markets. Overall, Singapore and Brunei are more constrained than the rest of their regional peers, given the relative size of their domestic markets. In turn, Vietnam, Thailand, Malaysia, and Hong Kong, while having larger domestic markets, rely considerably on travel and tourism as a key driver of growth (Appendix I). In contrast, China, Japan, and Indonesia score highly: China's score reflects the significant role of domestic demand, which accounts for more than 82 percent of its import-adjusted GDP; Japan's score is underpinned by strong private and public spending; while Indonesia's score is boosted by a large and growing middle class, as evidenced by the significant share of private consumption to GDP (Figure 4).

Figure 4. ASEAN+3: Import-Adjusted GDP by Component
(Percent share of GDP)



Sources: OECD IO tables; national authorities; and AMRO staff calculations.
Note: e/ refers to AMRO staff estimates—OECD Input-Output Tables are only available from 2005 to 2015. Data are not available for Lao PDR and Myanmar.

Adjustments based on qualitative factors are then incorporated, based on AMRO staff's discernment of country-specific situations, including the nominal size of the domestic market, among others. In particular, significant judgement is necessary for Lao PDR and Myanmar, neither of which is included in the OECD STAN database, and for which comparable input-output tables are not published. Consequently, the scores for both these economies are estimated relative to those of their developing country peers, Cambodia and Vietnam.

C. Economic Diversity

Economic diversity generally refers to the composition of domestic production and the trade structure of an economy. The lack of diversification increases an economy's vulnerability to widespread shocks, which can result in deeper recessions and undermine prospects for longer-term economic growth (OECD 2019). An economy that is well-diversified—that is, one with multiple drivers of growth—is also better positioned to rebound from an economic crisis. Coupled with capital and labor mobility, high economic diversity allows for a more stable path toward broad-based growth and development—there is greater likelihood that some sectors that have been impacted by a crisis could potentially rebound and transition to emerging growth sectors. In the COVID-19 context, highly diversified economies would be less vulnerable to the pandemic, given that they should be able to better support a more sustainable recovery, reducing their exposure to risks arising from the eventual withdrawal of policy support.

This paper's proposed framework takes into account the composition of domestic production as a proxy for economic diversity.[5] The variety of economic activities underpinning an economy's heterogeneity is gauged using the Herfindahl-Hirschman index (HHI), which measures concentration.[6] Similar to the other indicators in the framework, AMRO staff's judgement is applied whenever the HHI is unable to fully capture country-specific factors that affect economic diversity. The HHI ranges between 1/ $n_{j,t}$ and 1, and decreases with the degree of economic diversity. In other words, the lower the HHI, the more diversified the economy. On the other hand, if a large part of an economy's value-added (VA) is derived from a small number of sectors, the HHI of this economy would be closer to 1. The generalized formula used to compute the HHI is as follows:

$$HHI_t = \sum_{n=1}^{n_{j,t}} (S_{t,i}^{j})^2$$

where,
$S_{t,i}^{j}$ is the share of VA of sector i in the economy j; and
$n_{j,t}$ is the number of sectors in economy j at period t.

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5 This metric does not touch on trade structure (or export diversification) as a measure of economic diversity given its narrower definition and the ongoing impact of the pandemic on global trade. Nonetheless, high uncertainty in the trade landscape, when combined with high trade exposure (as experienced by some countries during the US-China trade tensions pre-pandemic and the current supply chain disruptions) could negatively impact the economy and increase its vulnerability.

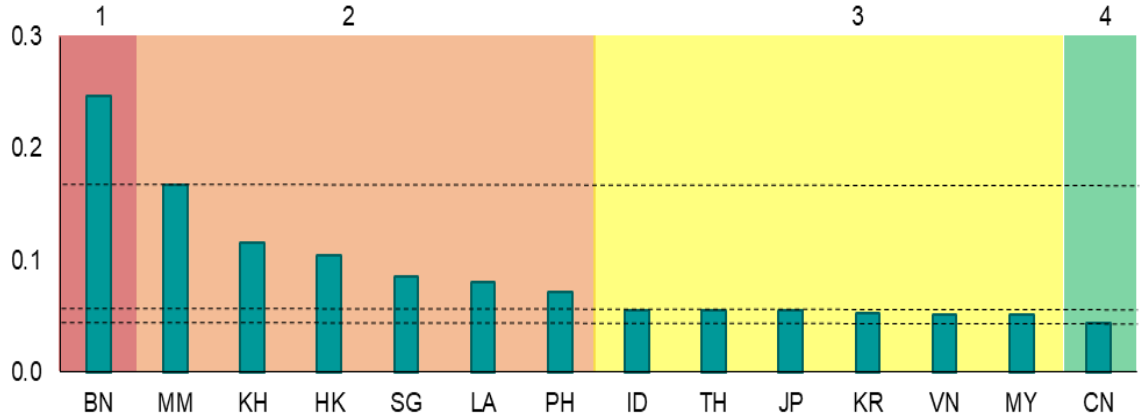
6 The HHI is our preferred measure of economic diversity, given the greater sensitivity of the Theil and Gini concentration indices to changes in the bottom and middle portions of the distribution (Trapeznikova 2019). Moreover, the HHI makes no assumption on the ideal distribution of an economy, making it simpler to calculate.

The VA data for 35 economic sectors are sourced from the ADB MRIOTs.[7] The MRIOTs data are reported in constant prices, and cover all of the ASEAN+3 economies except Myanmar. The VA readings for Myanmar, which is not a MRIOT constituent, are proxied by the industry shares of real GDP published by official sources. The scheduled annual updates to the MRIOTs enable periodic analysis and estimation of individual economy HHIs. The latest tables were published in December 2020 and contain annual VA data up to 2018, from which the HHIs discussed in this section are calculated.

A score is assigned to each economy based on the percentile of its HHI vis-à-vis the rest of the ASEAN+3 members. The economy with the highest HHI is assigned a score of "1," denoting the lowest economic diversity ("narrow") and therefore the highest potential vulnerability to exit risks. The group of economies with HHI between the second highest HHI reading and the 50th percentile is given a score of "2", while those with HHIs between the 50th percentile and lowest HHI reading are given a "3" rating. Lastly, the economy with the greatest economic diversity ("diverse") is given a score of "4," denoting the lowest vulnerability to risks arising from the withdrawal of policy support—which, in this case, is China (Figure 5 and Box 1).

Beyond diversification of economic activity, it is the ability of each sector and industry to adapt to the "new normal" situation that determine the speed of economic recovery. Some close-contact and in-person activities will continue to be disrupted by any resurgence in infections. However, there are also activities that are conducive to transitioning to "new economy arrangements and the capacity of firms to nimbly recast their business models will be key to a quick and sustained turnaround. The economic fundamentals of a country and policies adopted by its government to support such transformations would also be key to their implementation.

Figure 5. ASEAN+3: Herfindahl-Hirschman Index, 2018



Sources: ADB MRIOTs (December 2020); and AMRO staff calculations.
Note: Dotted lines represent AMRO staff's threshold for each rating with "1" denoting 'lowest economic diversity' and "4" denoting "highest economic diversity." Myanmar's HHI is proxied using shares of real GDP by industry.

[7] The ADB MRIOTs can be accessed via https://mrio.adbx.online/.

Box 1. Economic Diversity across the ASEAN+3 Region

The calculated HHIs suggest that China is the most diversified economy in the ASEAN+3 region, while Brunei is the least diversified. China has continued to shift away from the agricultural sector into manufacturing, wholesale, and retail trade. Overall, none of the 35 subsectors account for more than 10 percent of China's total value added (VA), earning the economy a "4" rating. Brunei, on the other hand, derived almost 62 percent of its VA from oil and gas in 2018, justifying its "1" score. The mining and quarrying sector accounts for 45 percent of total VA, while the production of refined petroleum and fuel accounts for the remaining 17 percent. Brunei's high reliance on the mining sector makes it less nimble in taking advantage of the new and fast-emerging growth drivers resulting from the pandemic-induced shift to digitalization, such as in services or tech-related manufacturing.

Economies with a score of "2" have similar degrees of economic diversity, albeit in different industries. Myanmar and Lao PDR are predominantly engaged in the agricultural sector, which accounts for more than 20 percent of total VA for both countries. Cambodia, on the other hand, has diversified its economy by expanding the manufacturing of textile products, although it is still largely dependent on agriculture. Elsewhere, a significant share of VA in the Philippines is generated by the retail trade and food processing sectors. Meanwhile, Hong Kong's and Singapore's VA are largely from wholesale trade and financial intermediation activities, in line with their roles as entrepots and financial centers; Singapore is slightly more diversified than Hong Kong, with its more prominent manufacturing sector.

Economies that are assigned a score of "3" are involved in a wider range of activities in the manufacturing and service sectors. The varying impact of the pandemic across different service subsectors highlight the necessity of having diverse sources of growth: economies that heavily rely on tourism and close-contact services have been severely affected. In contrast, those that have robust finance and insurance; information, communication and technology; and/or professional services sectors are benefiting from growing digitalization activity and remote working arrangements. Agriculture, manufacturing and a broad range of service subsectors contribute around 60 percent of the total VA for Japan, Korea, Malaysia, and Thailand, which make them more diversified than the previous group of economies. Elsewhere, Indonesia's economic structure has broadened to include food and beverage manufacturing, continuing its shift from agriculture and fishing. Vietnam, the most diverse economy within the CLMV bloc, has continued to expand its manufacturing base in a wide range of subsectors, such as food and beverage, textile products, leather products, and electrical and optical equipment, from an initial start in primary and agricultural products.

When qualitative factors are taken into account, the potential vulnerability to exit risks changes somewhat. It becomes relatively higher for Indonesia, but lower for the Philippines and Singapore. Indonesia's continuing reliance on palm oil and coal production—despite economic diversification efforts—earns it a "2" rating. Conversely, the service sectors in the Philippines and Singapore serve as a counterweight to the strong concentration in their respective manufacturing sectors. The growth of the service sector in the Philippines comes from the robust business process outsourcing (BPO) and tourism industries, while Singapore's service sector has expanded significantly, thanks to its early push toward digitalization and automation, which became an important advantage during the pandemic. Considering these factors, both economies are assessed to have levels of economic diversity that are closer to those of Malaysia and Thailand.

D. Remaining Policy Space

Policy space plays an important role in determining the strength of an economy's recovery from the pandemic, as well as the extent of its buffer against possible exit risks. The implementation of unprecedented policy measures by governments in the ASEAN+3 region to mitigate the impact of the pandemic has reduced policy space considerably in some economies. Analyzing an economy's remaining "firepower" to counter further manifestations of downside risks would provide an indication of the remaining support that could be deployed if necessary. The greater the remaining policy space in an economy, the better its ability to gradually withdraw existing policies, or to provide additional support if new measures are needed.

The multi-indicator framework employed by Poonpatpibul and others (2020) is applied as a starting point. Quantitative and qualitative indicators incorporating country-specific features are used across two key policy space dimensions—fiscal and monetary. The authors' analysis of fiscal space examines three areas: (1) debt sustainability; (2) risks to financing capacity and debt profile; and (3) country-specific factors. Concurrently, the assessment of (conventional) monetary policy space incorporates: (1) the degree of monetary policy autonomy; (2) the level of interest rates; (3) external vulnerability; and (4) financial imbalances and the economy's ability to respond to them. The authors then designate each economy's remaining policy space as either ample, moderate, or limited.

Using these categorizations, which require an overlay of expert judgement, a score is assigned to each economy to indicate the degree of remaining policy space. An economy with limited policy space would be ranked "1"; those assessed to have moderate policy space could receive a score of either "2" or "3", depending on the extent of that space, while those deemed to have ample space are designated a "4" ranking. A comprehensive assessment of policy space across ASEAN+3 economies suggests that when the COVID-19 pandemic struck, several economies in the region had ample to moderate fiscal and monetary room to support lives and livelihoods. However, given the large stimulus packages adopted during the pandemic, it was inevitable that the policy space had shrunk for several economies (Table 4).

The remaining policy space across ASEAN+3 economies (based on information as of March 2021) would have mitigated any vulnerability of the majority of ASEAN+3 economies to exit risks. Only Japan and Lao PDR had limited space in both the fiscal and monetary sectors, thus earning the weakest score of "1" (Figure 1). In contrast, Singapore was ranked "4" in terms of policy space availability and deemed to be the least vulnerable to exit risks according to this metric. Nine other economies were assigned a "3" rating. Overall, economies in the region had sufficient policy space to maintain an expansionary fiscal stance, as well as keep monetary policy accommodative (AMRO 2021).

Table 4. ASEAN+3: Assessment of Policy Space, End-2019 vs. End-2020

Policy space		Fiscal		
		Ample	Moderate	Limited
Monetary	Ample		Philippines Vietnam	
	Moderate	Korea Singapore Thailand	China Indonesia Malaysia Myanmar Philippines Thailand Vietnam	
	Limited	Brunei Darussalam Cambodia Hong Kong	Brunei Darussalam	Japan Lao PDR

Sources: Poonpatpibul and others (2020); and AMRO staff estimates.

E. Degree of Policy Support

Policy support has played a crucial role in counteracting the adverse impact of the COVID-19 pandemic on the region's economies. Support has been swift, large, and wide-ranging in terms of strategy, reach, and instruments (Table 1). Fiscal support has taken center stage, accompanied by monetary accommodation and financial measures, and has generally been commensurate with the impact of mobility restrictions and other containment measures on economic activity. In addition to direct budget expenditure, non-budget financing, sourced from public funds, public financial institutions or entities, and/or the use of past reserves, have also been employed.

This indicator focuses on the withdrawal of policy support and its effect on an economy. The potential impact is assessed based on two considerations. The first is the size of the economic stimuli as a percentage of GDP, and the second is the absolute number of policies that authorities must eventually withdraw. The rationale is quite intuitive—the bigger the fiscal support or the larger the number of economic policies that needs to be unwound, the greater the risk of pulling the rug out from under the economy. Conversely, the fewer the number of policies or the smaller the budget support, the lower the likelihood of cliff effects manifesting.

The size of economic stimuli is mainly derived from authorities' fiscal reports and government announcements. In order to ensure comparability across economies, only policy support that is extended because of the pandemic is considered. These pandemic-related policy responses are compiled in some detail and published by AMRO in its "Panoply of Pandemic Policies" database. Broadly, pandemic-driven stimuli has targeted three areas:

- **Public health expenditure.** Spending to protect lives has been targeted at increasing hospital capacity, testing capabilities, safety equipment, the hiring of medical professionals, as well as the procurement of vaccines and the rollout of vaccination programs.

- **Financial assistance for households.** Measures such as cash transfers, subsidies, and spending rebates have been introduced to support households, particularly during periods of mobility restrictions that have been enacted to contain the pandemic. These are usually one-off.

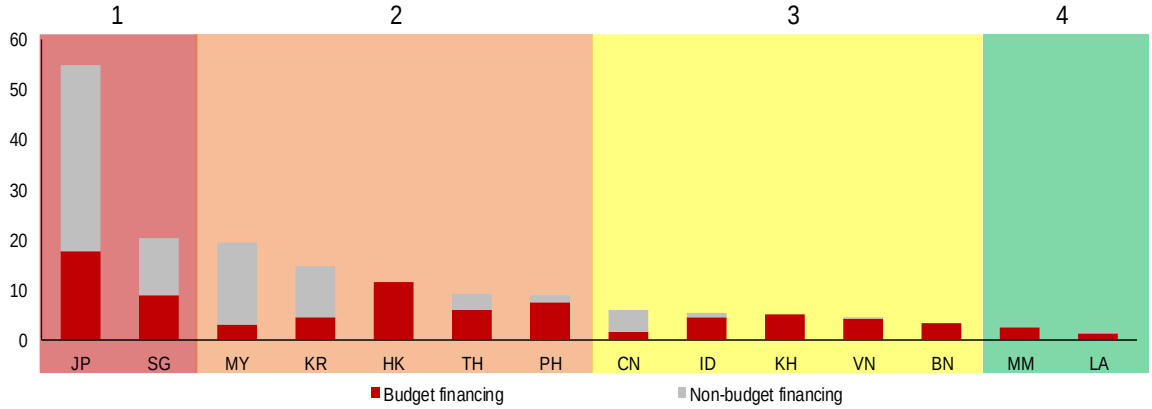
- **Financial assistance for businesses.** Standing credit facilities, credit guarantees, and expenditure rebates, as well as soft loans, among others, have been extended to tide domestic firms over during the pandemic.

While strong policy support has enabled steady recovery from the pandemic crisis, any mistimed, uncoordinated, or poorly communicated withdrawal could pose significant risks to growth. Missteps are more likely for economies with larger budget allocations and larger numbers of implemented stimuli measures. For example, Japan had provided the largest economic support package, equivalent to 54.8 percent of GDP, as of the end of February 2021, while Lao PDR had expended the least, at 1.6 percent of GDP; economic stimuli amounted to more than 10 percent of GDP in four other economies: Singapore, Malaysia, Korea, and Hong Kong (Figure 6). Each economy is assigned a score based on the percentile in which the size of its announced budget stimuli as percent of GDP falls, as follows:

"1" > 90th percentile
50th percentile ≤ "2" ≤ 90th percentile
10th percentile ≤ "3" ≤ 50th percentile
"4" < 10th percentile.

Governments have also implemented measures where the direct fiscal or monetary impact is not easily quantifiable. These policies usually fall under forbearance, payment extensions, debt moratoria, or measures to shore up market confidence. They include the introduction of temporary financing lines for businesses to manage their cash flows during the pandemic, the extension of the timeline for financial institutions to restructure loans, and/or delaying the implementation of new accounting or asset management rules. Such measures are usually announced without corresponding impact estimates. Regardless of whether a measure is quantifiable or not, any disorderly termination of these policies—such as an abrupt tightening of current rules on consumer loans—could negatively impact confidence and market sentiment, with rippling effects across the entire economy and financial system.

Figure 6. ASEAN+3: Economic Stimuli, February 1, 2020–February 28, 2021
(Percent of GDP)



Sources: National authorities via Haver Analytics; and AMRO staff estimates.
Note: The data covers governments' announced stimulus packages across regional economies from the start of the pandemic up to the cut-off date for AMRO (2021). The non-budget financing component corresponds to the fraction of government's announced economic relief/stimulus packages financed by non-budget resources, for example, funding from public funds, public financial institutions or entities, or fiscal reserves. BN = Brunei Darussalam; CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KH = Cambodia; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = Philippines; SG = Singapore; TH = Thailand; and VN = Vietnam.

The absolute number of economic support measures that have been implemented by each government is used to complement the explicit fiscal spending estimates, as a rough-and-ready proxy. The number of announced policies within each economy is ranked vis-à-vis the rest of its regional peers from "1" (the fewest) to "4" (the most) in the same way as that used to rank the size of economic stimuli. As of March 2021, Brunei had implemented the fewest number of pandemic policies, while Indonesia had the most (AMRO 2021). Based on this indicator, most economies in the region appear to have quite a number of policies that need to be unwound or allowed to lapse. Brunei, followed by China, Vietnam, Lao PDR, and Cambodia were at the stronger end of the rating range as of March 2021, given that they had implemented fewer measures at that stage compared to the rest. An economy's scores over the two dimensions—the size of fiscal spending and the number of pandemic policies—are then averaged to arrive at the final rating.

Clearly, any unwinding of economic measures should be necessarily cautious and gradual. AMRO staff's expert judgement is imposed to incorporate qualitative considerations. The

extent of COVID-19 infections, and existing macroprudential tools, among others, are all taken into account. The outcome from these adjustments is that nearly half of the region's economies received ratings of "2" or "3" for this metric, suggesting that they were somewhat vulnerable to the risk of cliff effects from the withdrawal of support at the time (Figure 1), and underscoring the importance of well-designed and coordinated exit strategies.

F. Economic Recovery Rate

The pace of economic recovery should be considered when assessing an economy's vulnerability to exit risks. The faster the recovery, the quicker a buffer is built, the less vulnerable the economy would be to any unwinding of pandemic-related policy support. The deviation of projected output in the current year from the pre-pandemic trend output, measured in real GDP, is estimated to determine the "recovery rate." This metric has been widely used in the literature to assess the persistent effects of recessions, a phenomenon associated with hysteresis or economic scarring (Cerra, Fatás, and Saxena 2020). The empirical evidence suggests that post-crisis economic recovery is usually not strong enough to guide output back to its pre-crisis trend (Cerra and Saxena 2008). Recent literature on the impact of the COVID-19 pandemic in Asia also shows that regional economies are likely to remain below their pre-pandemic trends in the near- to medium-term (IMF 2020; World Bank 2020; AMRO 2021).

In order to assign scores, the recovery rate for an economy is first constructed using two components (del Rosario 2021):

- The projected output is obtained from AMRO's country surveillance, where near-term GDP growth forecasts incorporate the economic developments of individual economies in the ASEAN+3 region (Figure 7).[8] In the context of this pandemic, these projections incorporate information on AMRO's assessment of the inflation outlook, labor market disruptions, as well as the likely extent of economic scarring, for example, the negative impact on domestic output from persistently elevated unemployment, as well as any inflationary pressure from greater demand-supply imbalances induced by widespread economic reopening (AMRO 2021).

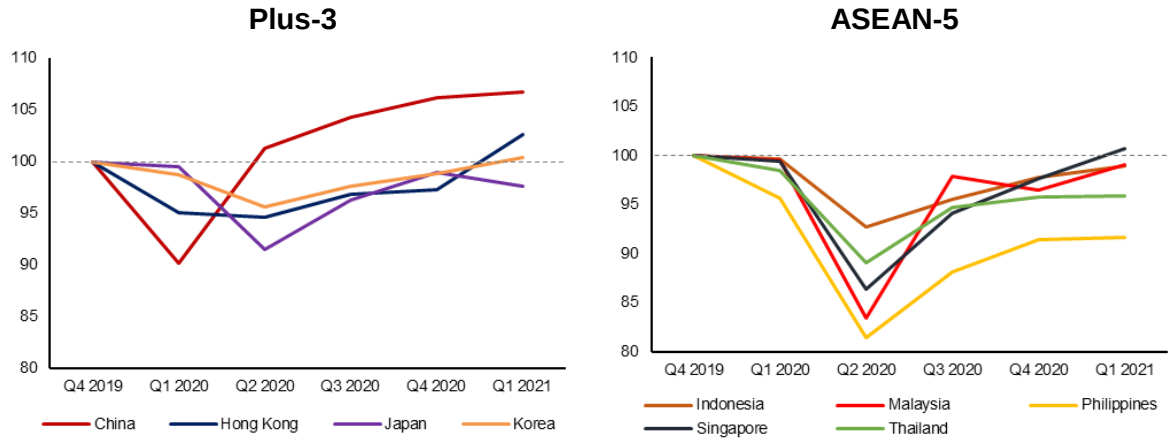
- The pre-pandemic trend output, which provides a rough gauge of what might have been the economy's trajectory had the pandemic not happened, extrapolates real GDP in 2021 based on the average growth rate over the three years prior to the onset of the pandemic (2017–19).

The resulting output gap or the deviation of projected output relative to pre-pandemic trend output represents the rate of recovery relative to other ASEAN+3 economies. This metric is then ranked across the 14 members. The more negative the output gap, the lower the score. The scores are assigned based on the percentile in which the output gap falls:

"1" > 70th percentile
40th percentile ≤ "2" ≤ 70th percentile
15th percentile ≤ "3" ≤ 40th percentile
"4" < 15th percentile.

[8] AMRO's country surveillance reports are available at https://www.amro-asia.org/publications/country-surveillance/amro-country-surveillance-reports/annual-consultation-reports/.

Figure 7. Selected ASEAN+3 Economies: Real GDP Levels
(Q4 2019 = 100, seasonally adjusted)



Sources: National authorities via Haver Analytics; and AMRO staff calculations.

As of Q1 2021, estimates of persistent output gaps across all regional economies through 2022 implied a still fragile and uneven pace of economic recovery. The region's projected output gaps at that time ranged between 2–14 percent (Appendix II); the resulting scores suggested that the policy stance should remain supportive (Figure 1), and that the substantial policy support deployed early on in the pandemic should only be scaled back—gradually and carefully—as the economy recovers

G. External Buffers

Foreign exchange (FX) reserves provide insurance against shocks. Reserves reduce the likelihood of balance of payment crises and preserve economic and financial stability (IMF 2015), and are generally associated with lower crisis risks and provide space for authorities to respond to transitory shocks (IMF 2013). In Asia, the importance of holding sufficient reserves was exposed during the AFC and affirmed during the GFC. In the context of the COVID-19 pandemic, the stronger an economy's FX reserve position, the less vulnerable it would be to potential shocks arising from any manifestation of policy exit risks, such as a loss in market confidence.

An economy's FX reserve coverage represents its ability to service its external liabilities—namely, current account and portfolio and other short-term debt liabilities—and to withstand resident capital flight, if necessary. Hence, a well-buffered external sector would allow the economy to absorb short-term capital outflows that might occur as a result of investor concerns over the timing or size of any withdrawal of policy support. The method used to rank the relative vulnerability of an economy's FX reserve position to pandemic policy exit risks vis-à-vis those of its regional neighbors comprises two steps:

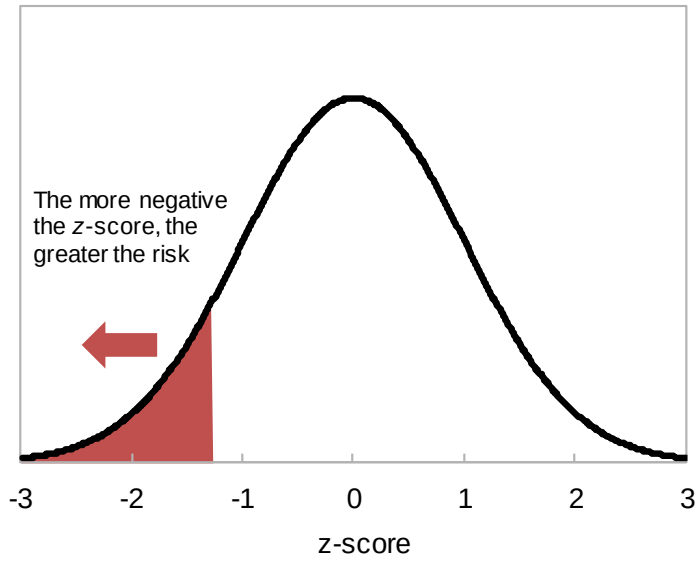
- First, the economy's reserve coverage ratios at any point in time are benchmarked against those of its pre-defined peer economies, by calculating the respective statistical z-scores as described in Ong and Gabriella (2020). Under the assumption that the indicators are normally distributed, FX reserve coverage ratios may be described as "one way" indicators, wherein the more negative the z-scores are from the respective benchmarks per unit of risk, the weaker the indicator (Figure 8).

- Next, the estimated z-scores are converted into corresponding percentiles, which are then averaged across the individual coverage ratios. The resulting average percentile is then assigned a rating as follows:

  "1" < 30th percentile
  30th percentile ≤ "2" ≤ 50th percentile
  50th percentile ≤ "3" ≤ 70th percentile
  "4" > 70th percentile.

The majority of ASEAN+3 economies seemed to be strongly buffered by their FX reserves as of Q1 2021. The estimated rankings indicated that the reserves of 9 of the 14 members were in the top 30th percentile among their global peers with another in the top 50th percentile (Figure 1).[9] In other words, these economies were well-placed at the time to withstand some degree of short-term capital flow volatility, in the event that any withdrawal of policy support spooked investors.

Figure 8. Ranking External Buffers



Source: Ong and Gabriella (2020).

IV. Conclusion

This paper provides a simple framework for assessing when ASEAN+3 economies could potentially start to unwind their pandemic policy support measures. As governments gradually bring domestic infections under control via expanding vaccination programs, many are already contemplating when and how to exit those measures. While prolonged stimuli will continue to reduce existing policy space and increase the dependence of some sectors, any disorderly or mistimed withdrawal runs the risk of economic and even financial turmoil. Our framework highlights the strengths and weaknesses of both conjunctural and structural aspects of an economy that are relevant for its ability to support and sustain a turnaround from the pandemic crisis.

[9] ASEAN+3 economies are benchmarked against global—rather than just regional—peers for this metric, given the international nature of external transactions.

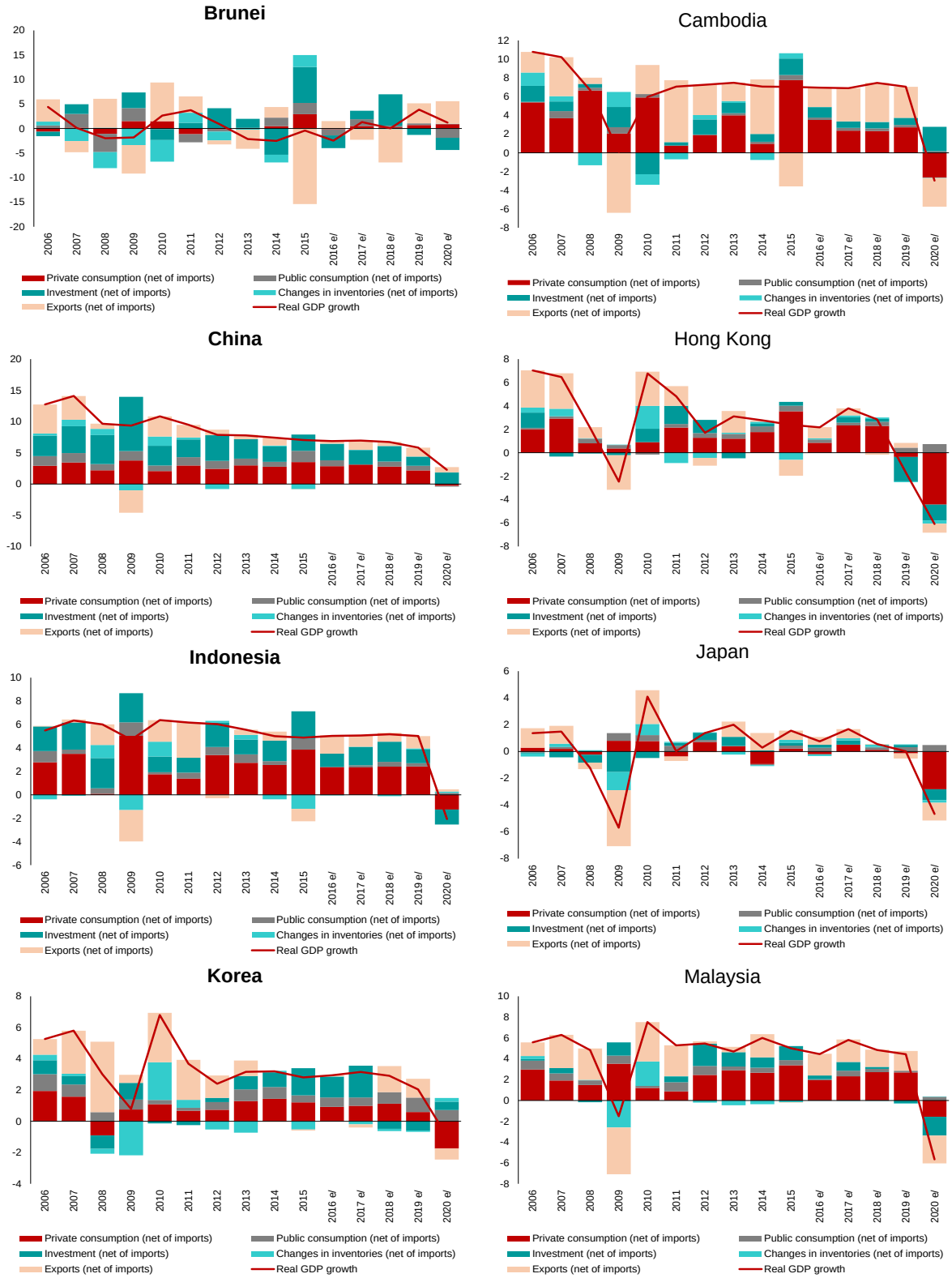
The cross-cutting metrics in our framework have been selected to capture as broadly as possible the key characteristics of an economy that would play important roles in ensuring resilience against any manifestation of exit risks. The scoring is based on quantitative methods, with overlays of qualitative, expert judgement by AMRO staff to ensure that country-specific factors are taken into account. The resultant index, which is calculated as a simple average of the scores assigned to each metric, shows the relative readiness of each ASEAN+3 economy to exit from pandemic policy support. Economies whose overall scores are between “2” and “3” should err on the side of caution by continuing, or in some cases expanding, their policy support measures. For instance, while a few economies were well-placed to start exiting from some of their support measures at the end of Q1 2021, it was also appropriate at the time for the majority to maintain their accommodative policies for a while yet (Figure 1). The index could potentially be applied to signal when conditions may be conducive for a country to move from pandemic to endemic state, but such decisions are ultimately dependent on the government’s pandemic policy.

Our framework also helps to identify areas where improvements could strengthen economic resilience. Some are structural in nature and changes will take time. For example, more than half the economies in the region rely considerably on exports to drive growth, underscoring the need for structural policies to expand domestic demand. Some economies would benefit from diversifying economic activity, for instance, from largely agriculture and manufacturing to more service-oriented areas, including greater investment in the healthcare sector to better prepare against future health crises. This framework is versatile in its flexibility—while it was initially developed to assess economic vulnerability in the ASEAN+3 to the withdrawal of policy support, it could also accommodate other metrics and indicators to focus on different but related aspects of recovery from this pandemic, for instance, the divergence in recovery across economies.

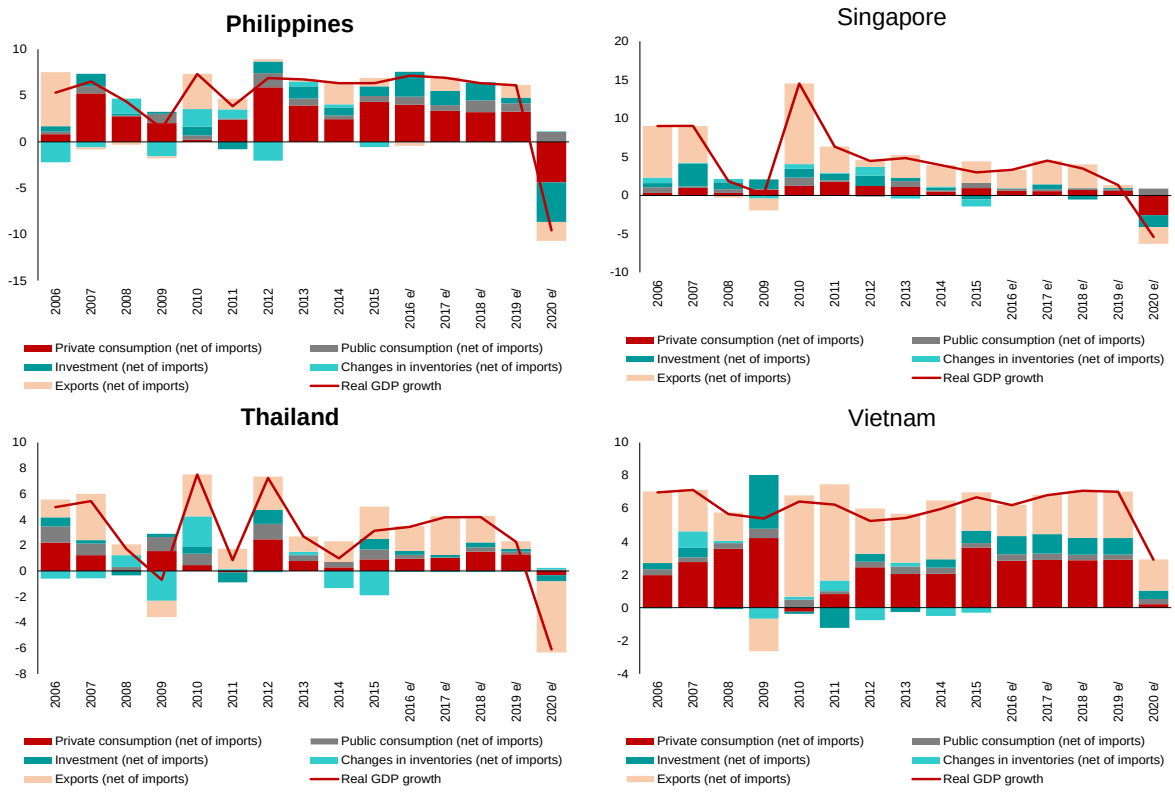
Appendix I. ASEAN+3: Import-Adjusted GDP, 2006–20

Appendix Figure 1. ASEAN+3: Contributions to Growth

(Percentage point contribution to real GDP growth)



Appendix Figure 1. ASEAN+3: Contributions to Growth
(Percentage point contribution to real GDP growth)

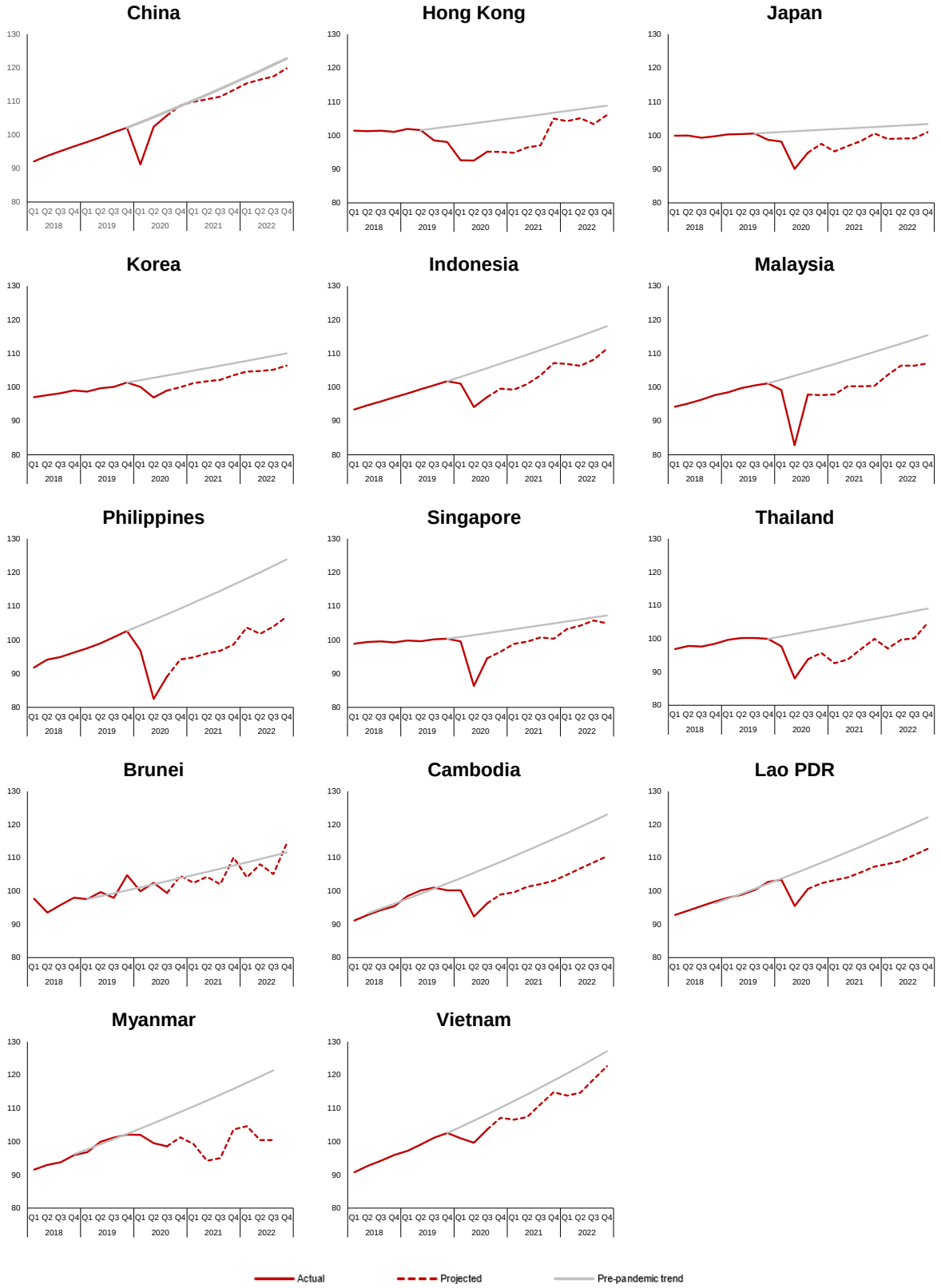


Sources: OECD IO tables; national authorities; and AMRO staff calculations.
Note: e/ refers to AMRO staff estimates. Data for Lao PDR and Myanmar are not available. OECD Input-Output Tables are only available from 2005 to 2015. Real GPD growth is actual data. Real GDP growth refers to actual growth. Any inconsistency with conventional GDP components is due to limited breakdown of GDP in some countries.

Appendix II. ASEAN+3: Estimating the Recovery Rate

Appendix Figure 2. ASEAN+3: Actual and Projected Real GDP Levels against Pre-Pandemic Trends

(Index, 2019=100)



Sources: National authorities via Haver Analytics; and AMRO staff calculations and estimates.
Note: The pre-pandemic trend is based on average 2017–19 GDP growth rates after taking the logarithmic transformation of real GDP. The 2021–22 growth path for each economy is based on AMRO's quarterly projections.

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